Advanced Composite Insoles for the Reduction of Stress Fractures

Award Information
Agency:
Department of Defense

Branch
Army
Amount:
$99,999.00

Award Year:
2012
Program:
SBIR

Phase:
Phase I
Contract:
W81XWH-12-C-0039

Agency Tracking Number:
A112-109-0388
Solicitation Year:
2011

Solicitation Topic Code:
A11-109
Solicitation Number:
2011.2
Small Business Information
Kingetics LLC
51 Kalola Place, Kihei, HI, -
Hubzone Owned:
N

Socially and Economically Disadvantaged:
N
Woman Owned:
N

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Abstract
Musculoskeletal injuries of the lower legs, as a result of strenuous and prolonged walking and running activities, are a primary problem for Army soldiers and other military populations. This proposal is focused on demonstrating the feasibility of a patent-pending orthotic device pioneered by Kingetics LLC to reduce injury and enhance ambulatory performance. Utilizing high modulus advanced composites, the orthotic design is based on innovative implementation of the well-known lever-fulcrum spring mechanism. The device efficiently reduces loading rates while increasing energy storage and energy return, thereby decreasing the risk of stress fracture injuries, and is also lightweight and puncture resistant. Whereas a preliminary pre-prototype device has undergone some promising early testing, Phase I efforts will generate a range of systematically varied concept designs, from which two of the most promising will be selected for prototyping under well controlled fabrication conditions. Numerous replicates of the selected prototypes will be manufactured for evaluation of puncture resistance and other mechanical properties. In addition, the Phase I efforts will make predictive assessments of the orthotics effects on human biomechanics, based on input from prototype mechanical data, and will provide quantitative concepts and models for incorporation of the orthotic into a synergistic military boot housing.

* information listed above is at the time of submission.